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ABSTRACT

This paper reports an exploratory investigation of motor patterns characteristic of maternal gameplaying behavior conducted with forty-eight 4-, 6- and 8-month-old infants and their mothers. Videotapes of 6-minute laboratory mother-infant play sessions were segmented into maternal games which were categorized according to the type and complexity of stimulation that the mother's motor patterns provided the infant. Categories and brief descriptions of the games are presented in tabular form. Measures of maternal game behavior reflecting low complexity level decreased with an increase in the age of the infant, while measures of maternal game behavior reflecting high complexity level increased. Results suggest that the sensorimotor level of the infant exerts an influence upon maternal motor activity during gameplaying, and that mother-infant gameplaying is a dynamic interactive process which enables the infant to acquire and refine motor skills. (Author/MS)

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Maternal Game Play with 4, 6, and 8 Month Old Infants: Developmental Changes[1]

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While the mother-infant play situation has been used to examine the development of infant social responses and infant attachment, few investigators have considered the possible developmental significance of patterns of motor behavior during mother-infant play. Since the infant's motor abilities rapidly change throughout the first year of life, the nature of his contribution to the playful interaction must also change. Thus, the mother-infant game is not a static setting event within which social behavior develops, but rather represents an interactive pattern of behavior with a developmental course of its own.

This study was an exploratory investigation of the motor patterns characteristic of maternal play behavior. It was hypothesized that the mothers of older infants would use games incorporating motor sequences of greater complexity than the mothers of younger infants.

48 mothers were asked to play with their 4, 6, or 8 month old infant for 6 minutes in a laboratory setting. In order to analyze the interactions, video tapes were segmented into games and then subdivided into bouts. A game was defined as a unit of maternal activity characterized by the rhythmic repetition of a subunit referred to as a bout. A bout was defined as the rhythmic coordination of maternal motor movements and vocalizations. A bout was proceeded and followed by a pause. For example, a bout might consist of the mother tickling the infant's stomach - - a motor component in conjunction with the utterance of a non-word sound - a vocal component. Repetition of the activity would qualify the segment as a game. In repeating the activity the mother might sometimes vary her behavior slightly, but retain a salient feature. For example, instead of tickling the infant's stomach, she would tickle his chin.

A narrative description of the mother's motor behavior during each game was also composed. Two examples of narrative descriptions of the games are:

> Mother does pat-a-cake with seated baby while clapping baby's hands.
>
> Mother wiggles the fingers of her outstretched hands and makes nonword sounds.

A system was devised by which games could be categorized and analyzed for developmental differences in terms of 1. The type of stimulation the mother's motor behavior provided the infant; and 2. The level of complexity of that stimulation. Games were categorized into 4 types: tactile, gross body movement, limb movement, and visual. The game I

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described earlier, in which the mother tickled the baby's stomach and chin is an example of a tactile game. An example of a gross body movement game is one in which the mother held the baby at his waist, lifted him up above her head, whirled him around while saying the word "helicopter" in a sing song voice. The narrative description I read of the mother playing pat-a-cake by clapping the baby's hands together is an example of a limb movement game. The description I read of the mother wiggling her fingers and saying non-word sounds is an example of a visual game. These 4 game types represent the type of stimulation the mother was using with the infant. Two levels of complexity of stimulation were apparent, and were labeled unconventional (or simple) and conventional (or complex). Simple games appeared to consist of stimulation for its own sake and to have random or unconventional structure. Complex games consisted of conventionally defined motor patterns which were conducive to imitation and learning by the infant. The game in which the mother wiggled her fingers is an example of an unconventional visual game. The pat-a-cake game in which the mother held the baby's hands and clapped them together is an example of a conventional limb movement game. All the tactile and gross body movement games were unconventional while within the visual and limb movement game types there were unconventional and conventional games. On the handout all game types and levels of complexity of stimulation are defined and examples are given. Reliability for coding of games, composition of narratives, and categorization of games was computed. Median percentage agreement was 81%, 76%, and 91% respectively. Each game type and level of complexity was analyzed for developmental differences.

Since all the games of the tactile category were unconventional or of the lowest level of complexity, it was hypothesized that mothers of older infants would use this to a lesser extent than would mothers of younger infants. There was a tendency for the proportion of tactile games in relationship to all other games types to decrease with age. In addition, the mothers of younger infants showed a preference for the tactile game type. That is, a greater number of mothers of young infants played a majority of games of this type than did mothers of older infants. There was also a decrease in the number of mothers who played at least one long tactile game as the age of the infant increased.

Age of the infant was not found to effect mother's use of gross body movement games. The proportion of total games falling within this category was relatively low at all ages.

There was a significant increase in the proportion of conventional limb movement games, computed in relation to all limb movement games, as a function of age of the infant. Mothers of 8 month olds played a greater proportion of conventional limb movement games than mothers of 4 month olds and mothers of 6 month olds. Mothers of older infants were more likely to employ limb movement games characterized by conventionally defined motor patterns while mothers of younger infants had a greater tendency to engage in limb movement stimulation for the sake of stimulation. The pat-a-cake game in which the mother took the infant's hands and clapped them together while reciting the familiar rhyme is an example of the conventional limb movement games which increased with age of the infant. In contrast, an example of the unconventional games which decreased with age of the infant is one in which the mother held the baby by the hands and jiggled his arms while repeating non-word sounds.

There was a significant increase in the proportion of conventional visual games, computed in relation to all visual games, as a function of age of the infant. Mothers of 8 month olds played a greater proportion of conventional visual games than mothers of 4 month olds. The pat-a-cake game in which the mother claps her own hands and recites the rhyme while the baby watches is an example of the conventional visual games which increased. In contrast, a common unconventional game which decreased with age of the infant was one in which the mother wiggled her fingers while she vocally made rhythmic high pitched noises.

It was hypothesized that conventional games encompassed a more complex form of stimulation than did unconventional games. The parameter of level of complexity was based upon the opportunity it provided for the infant to imitate and learn a specific motor pattern. In order to see if any mothers might be attempting to teach their infant a conventional limb movement, games were isolated in which the mother first demonstrated a limb movement and then manipulated the baby's limbs in accordance with the same motor pattern. No instances were found among the 4 month old mother-infant dyads. The mother of one 6 month old employed this strategy in two of her games. Three mothers of 8 month olds had a total of 6 of these games. In two of them infant imitation of the limb movement also occurred.

In Summary:

Measures of maternal game behavior reflecting low complexity level decreased with an increase in the age of the infant. This was reflected in the fact that with increase in age:

> The proportion of tactile games tended to decrease; preference for the tactile game type decreased; and the proportion of unconventional visual and limb movement games decreased.

In contrast, measures of maternal game behavior reflecting high complexity level increased with an increase in the age of the infant. This was reflected in the fact that with increase in age:

> The proportion of conventional visual and limb movement games increased; and imitation elicitation sequences were found to occur.

The question arises of how can this change in mother's motor behavior during games with her infant be interpreted? The mother-infant game requires the active participation of both members of the dyad. Based upon this premise, the results can indicate that the infant's changing motoric ability is influencing the mother's behavior. One could conclude that the mother's motoric changes are simply an adaptation to changes in the infant's form of participation.

Another interpretation for these results could be that the mother is not only adapting to but is also attempting to influence the infant's behavior. The mother, the more skilled member of the dyad, has primary responsibility for initiating and maintaining the interaction. When eliciting social interaction with the infant, she uses techniques which encourage him to participate to the maximum of his ability. For example, the 4 month old infant's primary avenue of participation is through visual contact and appropriate affective responses. The mother's use of tactile

games, such as tickling and nibbling, with their 4 month olds would be techniques of eliciting smiling and laughing. With the growing sophistication of the infant's motor skills, the mother may use the play setting to encourage the infant to practice and acquire motor skills. The best example of this would be some of the pat-a-cake games played with the 8 month old infants. During these games, the mother first clapped her hands, second, held the baby's hands and clapped them together, and third, the baby clapped his hands together while the mother watched.

In conclusion, this study suggests that maternal infant game playing is a dynamic interactive process which not only fulfills a social function but also provides the infant with an opportunity to acquire and refine motor skills.

Table 1

Categorization of Games

Category	Definition	Example Narrative Description
Tactile	Mother stimulates surface of an infant body part	"Mother ticklingly runs her fingers of one hand up seated baby's leg to its armpit and then to its waist. Mother makes non-word sounds."
Cross Body	Mother moves infant's body (trunk) in space	"Mother lifts baby over head and says helicopter!"
Limb Movement	Mother moves infants limbs in space	
Limb Movement Unconventional	A limb movement game lacking conventional structure in which the mother's purpose appeared to be stimulation of the limbs for the sake of stimulation.	"Mother has seated infant by arms and shakes them while saying 'look here'."
Limb Movement Conventional	A limb movement game characterized by conventional limb movements which may be imitated and later learned by the infant. The following games were categorized as limb movement II games: (a) pat-a-cake (b) peek-a-boo (c) clapping (d) waving bye, bye (e) swimming	"Mother does pat-a-cake with seated infant while clapping infant's hands"
Visual	The mother provides distal stimulation in terms of motor movements that may be visually observed by the infant	
Visual Unconventional	A visual game lacking conventional structure in which the mother's purpose appeared to be that of maintaining the visual attention of the infant	"Mother wiggles the fingers of her outstretched hands and makes non-word sounds. Infant seated very attentive to fingers"

Visual Conventional	A visual game characterized by conventional motor movements which may be imitated and later learned by the infant	"Mother does pat-a-cake while infant watches"
Combination	Mother combines two or more of the above categories in one game	
Combination of convertional Limb Movement and Conventional visual	Combination of conventional limb movement and conventional games involving the same motor pattern	"Mother has baby by hands and goes through motions of pat-a-cake as she says words. She releases baby's hands and goes through motions and words of pat-a-cake. Baby claps her hands as mother goes through game herself. At end of pat-a-cake game mother says 'cha'."